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Comparison between the Multipeak (MPEAK) and Spectral Peak (SPEAK) speech coding strategies on objective and subjective speech tests by some cochlear implants

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Two groups of hearing-impaired adults with a severe to profound hearing loss participated in this comparison study and were tested at two sessions over a longer period with assistive devices, either cochlear implants (CI) or hearing aids (HA). One group consisted of four cochlear implanted subjects that for some years used the multipeak (MPEAK) speech coding strategy of the Nucleus 22-channel cochlear implant system and later was upgraded to the spectral peak (SPEAK) speech coding strategy of that system. Four experienced hearing-aid users, all with a profound hearing loss, represented the other group, and all of them had between the test periods exchanged their older hearing aids to newer ones. The aim of the study was to evaluate the change in performance when the SPEAK processing strategy replaced the MPEAK strategy, and the older hearing aid was replaced with new models. The test battery consisted of two parts: speech perception tests and self-rating performance inventory (PIPSL). The speech tests consisted of segmental test, test of prosodic contrasts and Connected Discourse Tracking (CDT) test, presented in two test situations, audiovisually and auditory only. All test were presented in quiet.

The obtained results showed small changes between MPEAK and SPEAK coding strategy on the speech recognition test, but there was a significant improvement at least on one test for the CI-group when using the SPEAK speech coding strategy. Average percentages of transmitted information of the vCv-syllables, presented audiovisually, was significantly greater for three of four subjects with the SPEAK speech coding strategy compared to MPEAK. The results on the CDT-test showed for the same presentation mode an improvement around 20 words/min for two of the poorer subjects with the SPEAK strategy, but no improvement was obtained by the two better subjects. In the test situation auditory alone, however, there was an improvement around 20% for the consonants by the two better subjects. Average and individual scores on the speech recognition test obtained by the HA-group showed no significant differences between the two hearing aids. One of the subjects scored a poorer result on the CDT-test auditory alone with HA:2 compared to HA:1.

The subjects’ responses to the questionnaire concerning listening situations in everyday life showed for the CI-group significant changes between MPEAK and SPEAK for the category “Personal”. The mean results rated by the HA-users showed significant changes between the two hearing aids for questions concerning speech. Poorer results were rated by the subjects fitted with HA:2 compared to HA:1 for the categories about speech recognition with or without visual cues.